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render it malleable, and for selectively applying the mold pieces to the tube for shaping the selected portion of the tube.

AG
11 ~~34~~⁹ (Amended) An apparatus as claimed in Claim ~~31~~⁹, wherein positive air pressure is supplied to the tube at its unselected end, while the selected end of the tube is being heated and molded, to cause the tube to conform to the shape being imparted by the mold.

REMARKS

The undersigned has submitted herewith a Power of Attorney and an Associate Power of Attorney. It is respectfully requested that these documents be entered in the subject application so that all future correspondence will be directed to the undersigned.

This Amendment is in response to the December 26, 2001 Office Action issued in connection with the above-identified patent application. By this Amendment, claims 1-13, 15, 19-22, 27-30, 33 and 35 have been cancelled. Claims 38-47 have also been cancelled via the applicants' prior election of claims 1-37, as stated in paragraph 1 of the December 26, 2001 Office Action. Applicants reserve the right to prosecute non-elected claims 38-47 by way of one or more divisional applications. The pending claims in this application are now independent amended claim 24, with amended claims 14, 16-18 and claims 23, 25 and 26 depending therefrom, and amended independent claim 31 with claims 32, 34, 36 and 37 depending therefrom. No new matter has been added. The Examiner's review and consideration of the claim amendments is respectfully requested.

The subject invention is directed to a mold for shaping a tube and, specifically, an exhaust tube used to mate with an end of a starter tube to form optic fibers. As is known in the art, starter tubes have standardized dimensions, specifically, an opening diameter dimension which, in effect, dictates the diameter dimensions of the exhaust tubes which must be manufactured to form a precise interface therewith. This is accomplished, as explained on page 20 of the subject application, by horizontally mounting a tube to a lathe and positioning an end of the tube into a mold for rotational movement of the tube in the mold. The mold includes sides and an end cap dimensioned for seating in the tube end and to accommodate rotational movement of the tube about the cap. By applying heat through the mold, the interfacing tube end will be softened and manipulated by the mold to the desired dimension and configuration so that the resulting exhaust tube can then be used to mate with an end of a starter tube in an intended manner.

More specifically, and with regard to amended independent claim 24, a multi-piece mold for shaping a glass tube is provided. The mold includes two elongated sleeve-like pieces and an end plug piece including a cylindrical stub for insertion into the opening of the tube "and dimensioned for allowing rotational movement of the tube about the cylindrical stub" for controlling the inner diameter of the tube.

As recited in amended independent claim 31, an apparatus for shaping a selected portion of a glass tube is provided. The apparatus includes a support means for holding the tube "and for imparting rotational motion to the tube". The apparatus of claim 31 also recites that the mold includes an end plug "which is dimensioned for allowing rotational movement of the tube about the end plug".

It is pointed out that the rotational movement of the tube about the cap or end plug, as is now specifically recited in the amended independent claims, is an important feature because it

provides for the precise concentricity of the tube end for proper mating with an end of a starter tube.

Turning now to the Office Action, and dealing first with formal matters, it is believed that the amendments to the claims and the cancellation of certain claims now overcome the Examiner's rejection under 35 U.S.C. §112 second paragraph. Also, and as indicated above, the paragraph extending between page three through the top of page 4 of the subject application has been amended to include the serial numbers of the patent application referred to therein.

As for the non-formal rejections, the Examiner has rejected applicants' pending claims as allegedly rendered obvious by the combination of Wilson (677,161) in view of Prost (4,846,746). Specifically, the Examiner relies on Wilson as teaching all the elements of the claims except for the element of the heating source disposed within the mold, an omission the Examiner seeks to remedy with the teachings of Prost. Applicants respectfully traverse this rejection.

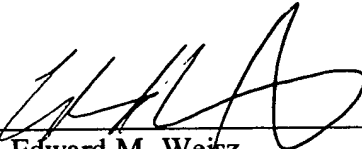
Wilson teaches a stationary-type mold for a glass tube. The mold is disposed, as shown, in a vertical manner and holds the tube in a stationary position during pressing of the mold about an end of the tube for molding. It is noted that this reference does not teach or suggest the use of an end plug piece or cap, and the Examiner refers to Sherrerd (Patent No. 1,591,060) for this teaching. However, both Wilson and Sherrerd teach a vertical mold arrangement and neither teaches the use of an end plug piece "dimensioned for allowing rotational movement of the tube about the cylindrical stub" as is now recited in amended claim 24. Likewise, neither Sherrerd or Wilson teach a support means for holding the tube and "for imparting rotational motion to the tube" about an end plug "which is dimensioned for allowing rotational movement of the tube about the end plug" as is now recited in amended claim 31. Moreover, although Prost may disclose the use of heating element disposed in a mold, it, likewise, does not teach applicants'

invention as set forth in amended claims 24 and 31. As neither of the cited references whether considered alone or in combination with each other teach or suggest the invention as now set forth in amended claims 24 and 31, it is believed that independent claims 24 and 31, along with their respective dependent claims, are now in condition for allowance.

Respectfully submitted,

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Dated: May 24, 2002

AMENDMENTS TO THE SPECIFICATION AND CLAIMS SHOWING CHANGES

In the Specification:

Replace the paragraph extending from page 3, line 15 to page 4, line 7 with the following replacement:

--Various solutions to the problems of shaping glass tubes are disclosed in Applicants' co-pending applications titled "Apparatus and Method For Shaping Glass Tubes" (Application Serial No. 09/497,044, filed February 2, 2002) and "Apparatus and Methods For Shaping Glass Tubes With Molds" (Application Serial No. 09/497,043, filed February 2, 2000)[; both of which are assigned to the assignee of the present application]. However, in the molding operation disclosed in those applications, the exhaust tube must be heated to a very high temperature by means of a torch until the end region of the tube becomes soft. Then, the torch is removed and the mold pieces are applied to the end region of the tube. During the time the torch is removed and until the mold pieces are applied, the end region of the tube undergoes some cooling whereby, when the mold is applied, the tube may not have the desired softness. Overheating the tube end to compensate for the ensuing cooling may result in the tube end deforming in an undesired manner. The prior art schemes also require that the torch be moved via a motor or other control means under relatively high temperature conditions.--

In the Claims:

Please cancel claims 1-13, 15, 19-22, 27-30, 33 and 35 and amend the following claims.

14. (Amended) A multi-piece mold as claimed in Claim [13] 24, wherein the glass tube is a hollow cylindrical glass tube; and wherein the heat [distribution channels] source includes distribution channels through which gas may be distributed with gas jets emanating along the inner surface of at least one of the pieces [the first piece, for enabling the first piece of the mold to function as a heat source and to mold the tube].

16. (Amended) A multi-piece mold as claimed in Claim 14, wherein the distribution channels within the at least one [first] piece is coupled to tubing coupling the distribution channels to a gas fitting to which a source of gas may be attached.

17. (Amended) A multi-piece mold as claimed in Claim 14, wherein ejection of gas occurs at several points along the inner surface of said at least one [first] piece.

18. (Amended) A multi-piece mold as claimed in Claim 14, wherein at least one of [the first and second side] said pieces includes ventilation channels extending between its inner and outer surfaces to enable air and gases trapped between [the] outer walls of the tube and the inner surfaces of the mold to escape.

24. (Amended) A multi-piece mold for shaping a glass tube comprising:

two elongated sleeve-like pieces which, when joined, encircle a portion of the tube for shaping the tube; and

an end plug piece including a cylindrical stub for insertion into the opening of the tube and dimensioned for allowing rotational movement of the tube about said cylindrical stub for controlling the inner diameter of the tube; and

wherein at least one of said pieces of the mold includes a heat source, formed within the one piece, for heating the tube to render it malleable.

31. (Amended) Apparatus for shaping a selected portion of a glass tube comprising:

a support means for holding the tube and for imparting rotational motion to the tube;

a multi-piece mold having one piece in which is formed a heat distribution source, said mold having two side pieces for imparting an oblate cone-like shape to a selected end portion of the tube while leaving an opening for accessing the opening of the tube at its selected end, and wherein said mold includes an end plug which is inserted in the opening of the tube and which is dimensioned for allowing rotational movement of the tube about the end plug for controlling the inner diameter of the tube at its end surface; and

an actuatable mechanical holding means for holding the multi piece mold, including means for holding the one piece in which is formed a heat distribution source, in proximity to the selected portion of the tube for heating the selected tube portion to

render it malleable, and for selectively applying the mold pieces to the tube for shaping the selected portion of the tube.

34. (Amended) An apparatus as claimed in Claim [33] 31, wherein positive air pressure is supplied to the tube at its unselected end, while the selected end of the tube is being heated and molded, to cause the tube to conform to the shape being imparted by the mold.